Elementary Education: Multiple Subjects (5031)

|	*Test at a Glance*
Test Name	Elementary Education: Multiple Subjects
Test Code	5031
Total Time	3.5 hours (4 separately timed subjects)
Format	Multiple-choice questions, scientific or four-function calculator use permitted.

Elementary Education: Multiple Subjects

Reading and Language Arts Subtest | Mathematics Subtest | Social Studies Subtest | Science Subtest

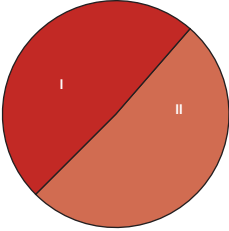| Subtests		Subject Test Length (Time)	Subject Test Length (Questions)
5032	Reading and Language Arts	60	65
5033	Mathematics	50	40
5034	Social Studies	50	55
5035	Science	50	50

About This Test

The purpose of the test is to assess whether the entry-level elementary teacher has the content knowledge that is important, necessary, and needed at time of entry to the profession in order to teach English, mathematics, social studies, and science at the elementary level. The test is designed to support a generalist elementary school license.

This test may contain some questions that will not count toward your score.

Elementary Education:
Reading and Language Arts Subtest

(5032) Time: 60 minutes, Format: Multiple-choice

Elementary Educ. Multiple Subjects
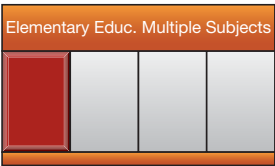
Reading and Language Arts Categories	Approximate Number of Questions	Approximate Percentage of Subtest
I. Reading	32	49%
II. Language, Writing, and Communication	33	51%
Total	**65**	**100%**

About This Subtest

The Elementary Education: Multiple Subjects: Reading and Language Arts subtest is designed to assess whether an examinee has the broad knowledge and competencies necessary to be licensed as a beginning teacher at the elementary school level. The 65 multiple-choice questions are based on the material typically covered in a bachelor's degree program in elementary education.

Topics Covered

I. Reading

- Foundational Skills
  - Understands key ideas relevant to the foundations of literacy and reading development (e.g., language acquisition, support of second-language learners, concepts of print)
  - Understands the role of phonological awareness (e.g., rhyming, phonemic deletion and substitution, segmenting onsets and rimes), and phonics and word analysis skills (e.g., letter-sound correspondences, syllabication patterns, morphology) in literacy development
  - Understands the role of fluency (e.g., rate, accuracy, and prosody) in supporting comprehension
  - Knows the stages of early orthographic development (e.g., drawing pictures, scribble, letter-sound correspondence in word writing)

- Literature and Informational Texts
  - Understands the role of comprehension (e.g., role of prior knowledge, referring to explicit and inferred text details and examples, metacognition)
  - Understands the basic elements of literature and informational texts
  - Understands the basic elements of poetry (e.g., verse, rhythm, meter) and drama (e.g., puppetry, story theatre)
  - Understands how to determine the meanings of words and phrases as used in texts, including figurative language (e.g., metaphor, simile, alliteration)

II. Language, Writing, and Communication

- Language
  - Knows the components of written language (e.g., elements of grammar, usage, syntax)
  - Knows sentence types (e.g., declarative, imperative) and sentence structure (e.g., simple, compound, complex)
  - Understands the basic components of vocabulary (e.g., affixes, root words, context clues)

- Writing
  - Knows types (e.g., narrative, persuasive, journaling) and traits (e.g., tone, purpose, audience) of writing
  - Knows the stages of the writing process (e.g., draft, edit, publish)
  - Knows structures (e.g., description, definition, examples) and organization (e.g., descriptive, comparison/contrast, persuasion) of writing
  - Understands how to use resource material (e.g., types of resources, graphic organizers) in reading and language arts
- Communication
  - Understands different aspects of speaking (e.g., purpose, audience, tone)
  - Understands different aspects of listening (e.g., following directions, responding to questions appropriately, focusing on the speaker)
  - Understands different aspects of viewing (e.g., interpreting images, evaluating media techniques, understanding the message)
  - Understands the role that speaking, listening, and viewing play in language acquisition for second-language learners

Reading and Language Arts Sample Test Questions

The sample questions that follow illustrate the kinds of questions in the test. They are not, however, representative of the entire scope of the test in either content or difficulty. Answers with explanations follow the questions.

<u>Directions</u>: Each of the questions or incomplete statements below is followed by four suggested answers or completions. Select the one that is best in each case.

1. Entries in outlines are generally arranged according to which of the following relationships of ideas?

    (A) Literal and inferential

    (B) Concrete and abstract

    (C) Linear and recursive

    (D) Main and subordinate

2. Manuel is the tallest of the two boys.

    Which of the following statements about the above sentence is true?

    (A) The sentence is written correctly.

    (B) The subject and verb do not agree.

    (C) The word "boys" should be possessive.

    (D) "Tallest" modifies Manuel incorrectly.

3. All of the following statements are descriptive of listening behavior EXCEPT:

    (A) Careful listening can lead to anticipation of a speaker's actions.

    (B) People learn to listen selectively and can even shut out what is undesirable.

    (C) Listening comprises at least one-half of all communication.

    (D) The ability to be a good listener comes naturally and without training.

4.

    I. The teacher from Nebraska displayed Native American artifacts to her class.

    II. The teacher displayed Native American artifacts from Nebraska to her class.

    The meaning of sentence I differs from that of sentence II in that the

    (A) subject of sentence I is "teacher" whereas the subject of sentence II is "artifacts"

    (B) first sentence ends in a prepositional phrase whereas the second sentence does not

    (C) sentences do not have the same simple predicate

    (D) adjective phrase "from Nebraska" modifies different nouns

5. They set two rats in cages side by side, and one was furtive, timid, and small, and the other was glossy, bold, and big.

    The sentence above is an example of a

    (A) simple sentence

    (B) compound sentence

    (C) complex sentence

    (D) compound-complex sentence

6. My sister and I always loved <u>sledding</u> down the hill behind our house.

    The underlined word in the sentence above is an example of

    (A) a conjunction

    (B) a participle

    (C) a gerund

    (D) an adverb

7. Free writing, brainstorming, clustering, and idea mapping are most important during which stage of the writing process?

    (A) Prewriting
    (B) Drafting
    (C) Revising
    (D) Proofreading

Questions 8–9 refer to the following poem:

Leave me, O love which reaches but to dust;
And thou, my mind, aspire to higher things;
Grow rich in that which never taketh rust,
Whatever fades but fading pleasure brings.

8. In line 1 "dust" serves as a metaphor for

    (A) ignorance
    (B) death
    (C) loneliness
    (D) confusion

9. The lines above comment on the speaker's desire to

    (A) seek out immediate pleasures
    (B) enrich himself
    (C) reject that which is transitory
    (D) revive the past

10. According to research, which of the following is the single most important home-based activity for preschool children in building the knowledge required for children's eventual success in reading?

    (A) Children's memorizing nursery rhymes
    (B) Families' talking about school
    (C) Parents' reading aloud to children
    (D) Parents' teaching the alphabet

11. When a student who is reading aloud substitutes a word with a similar meaning for a word that appears in print, the teacher's most appropriate response would be to

    (A) ask the student to reread the word correctly
    (B) correct the miscue by pronouncing the correct word aloud
    (C) write both words down, and have the student identify the word as it appears in the text
    (D) allow the student to continue reading

12. Research shows that fluency increases when readers frequently engage in easy reading. Which of the following is most likely to be effective in making easy books acceptable to a nonfluent older student?

    (A) Providing opportunities for the older student to discuss with classmates the experience of reading self-selected books to a younger student
    (B) Asking a much younger, fluent reader to read an easy book aloud to the older student
    (C) Assigning an easy-to-read nonfiction book to the older student for independent reading
    (D) Encouraging other older students to interrupt and correct when the student is reading easy books aloud

13. The best way to develop students' metacognitive skills is for teachers to do which of the following?

    (A) Give the students a few global prereading questions to guide their reading.
    (B) Advocate and model self-questioning during reading.
    (C) Have the students memorize the new vocabulary words needed to comprehend the reading selection.
    (D) Provide opportunities for students to write comprehension questions for each other.

Reading and Language Arts Answers

1. The correct answer is D. The entries in outlines generally present a main idea followed by a hierarchical arrangement of subordinate ideas.

2. The correct answer is D. "Tallest" is in the superlative degree which is used when comparing more than two things. "Taller" is the correct word to use since it is in the comparative degree.

3. The correct answer is D. Authorities agree that effective listening is not a natural ability but requires study and practice.

4. The correct answer is D. The meaning of the two sentences differs because in sentence I the teacher is "from Nebraska" and in sentence II the Native American artifacts are "from Nebraska." Thus, the placement of the adjective phrase "from Nebraska" after two different nouns changes the meaning of the sentences. A is incorrect because "teacher" is the subject of both sentences. B is incorrect because both sentences end in the prepositional phrase "to her class." C is incorrect because the simple predicate of both sentences is "displayed."

5. The correct answer is B. A simple sentence contains only one independent clause. This sentence has three independent clauses joined by the conjunction "and." Without dependent clauses, the sentence cannot be characterized as either "complex" or "compound-complex."

6. The correct answer is C. In this sentence, the word "sledding" is a gerund, a verb form (the present participle) functioning as a noun.

7. The correct answer is A. The terms mentioned are processes and devices associated with generating new ideas and organizing them. These processes and devices would not be associated with proofreading (D). While they might be part of drafting (B) or revising (C), they are most important during the prewriting stage of the writing process.

8. The correct answer is B. In literature the word "dust" is often associated with death because life forms decay into soil after death. A metaphor is figurative language that connects one image or idea with another.

9. The correct answer is C. The word "transitory" refers to change, and the speaker mentions a desire to reject things that turn to dust, acquire dust, and start to fade. These are all types of change.

10. The correct answer is C. Research shows that parents' reading aloud to children during the preschool years is the most influential home literacy activity and is especially beneficial when children are active participants.

11. The best answer is D. According to Ken Goodman, the developer of miscue analysis, miscues are not random and have a variety of causes. They are the result of reader's constructions of the linguistic message and therefore are made by everyone when reading aloud.
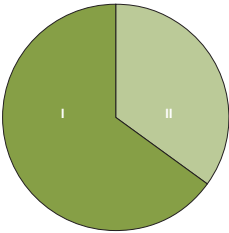
12. The best answer is A. Fluency refers to reading smoothly, quickly, and with expression. Option A offers the older student opportunities to engage in meaningful literary experiences while gaining courage, self-esteem, and experiencing ownership.

13. The best answer is B. In order to create strategic readers, it is important to show students how to use the strategy and be explicit about why the strategy is helpful to them.

Elementary Education:
Mathematics Subtest

(5033) Time: 50 minutes, Format: Multiple-choice

Elementary Educ. Multiple Subjects
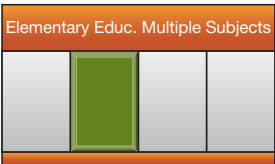
	Mathematics Categories	Approximate Number of Questions	Approximate Percentage of Subtest
I.	Number Operations and Algebraic Thinking	26	65%
II.	Geometry, Measurement, Data, and Interpretation	14	35%
	Total	**40**	**100%**

About This Subtest

The Elementary Education: Multiple Subjects: Mathematics subtest is designed to assess whether an examinee has the broad knowledge and competencies necessary to be licensed as a beginning teacher at the elementary school level. The 40 multiple-choice questions are based on the material typically covered in a bachelor's degree program in elementary education.

Topics Covered

I. Number Operations and Algebraic Thinking

- Understands prenumeration concepts (e.g., informal counting, meaning of number, patterns)
- Understands basic number systems (e.g., whole numbers, integers, rational numbers, fractions, decimals)
- Understands four basic operations (i.e., addition, subtraction, multiplication, and division) and their properties (e.g., commutative, associative, distributive, order of operations)
- Understands basic concepts of number theory (e.g., factors, multiples, place value, odd/even, prime/composite)
- Understands how to solve problems, including word problems, using multiple strategies (e.g., modeling, estimation, algorithms) and assess the reasonableness of results
- Understands how to generate, describe, and explore numerical patterns and engage in mathematical investigations

- Understands basic algebraic methods and representations (e.g., variables, expressions, ordered pairs, tables, graphs)
- Understands the associative, commutative, and distributive properties
- Understands additive and multiplicative inverses
- Understands the special properties of zero and one
- Understands equations and inequalities
- Understands the appropriate application of formulas

II. Geometry, Measurement, Data, and Interpretation

- Understands properties and attributes of two- or three-dimensional figures and their hierarchy of classification
- Understands transformations (i.e., rotations, reflections, and translations), geometric models, and nets
- Understands nonstandard, customary, and metric units of measurement (e.g., length, time, temperature, volume, mass)
- Understands visual displays of quantitative data (e.g., picture graphs, bar graphs, pie charts, line plots)
- Understands simple probability and intuitive concepts of chance (e.g., flipping a coin, spinning a spinner, rolling a number cube)
- Understands fundamental counting techniques (e.g., permutations, combinations, tree diagrams)
- Understands basic descriptive statistics (i.e., mean, median, mode, and range)

Mathematics Sample Test Questions

The sample questions that follow illustrate the kinds of questions in the test. They are not, however, representative of the entire scope of the test in either content or difficulty. Answers with explanations follow the questions.

Directions: Each of the questions or incomplete statements below is followed by four suggested answers or completions. Select the one that is best in each case.
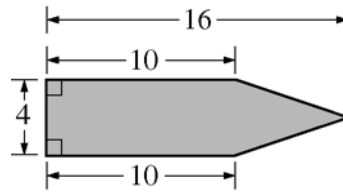
1. Riding on a school bus are 20 students in 9th grade, 10 in 10th grade, 9 in 11th grade, and 7 in 12th grade. Approximately what percent of the students on the bus are in 9th grade?

   (A) 23%

   (B) 43%

   (C) 46%

   (D) 76%

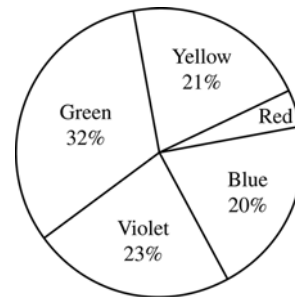2. Which of the following is equal to 8^4 ?

   (A) 4,032

   (B) 4,064

   (C) 4,096

   (D) 4,128

3. In the formula $x = 10y$, if y is positive and the value of y is multiplied by 2, then the value of x is

   (A) divided by 10.

   (B) multiplied by 10.

   (C) halved.

   (D) doubled.

4. What is the area of the shaded region above?

   (A) 30

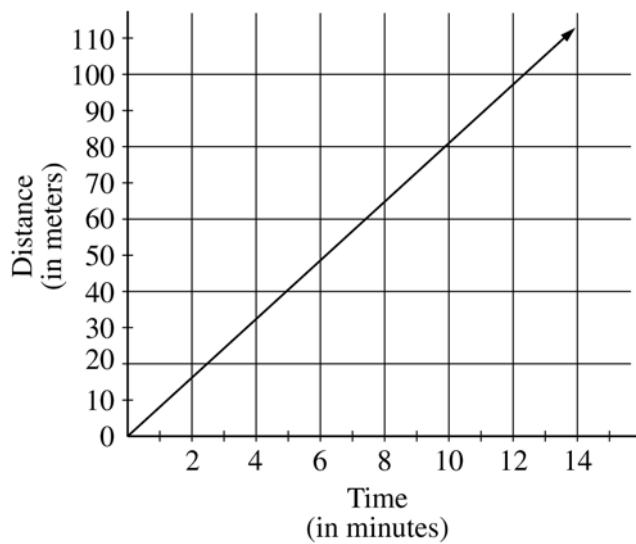   (B) 52

   (C) 64

   (D) 116

5. The circle graph above represents the percent of colored gems in a collection. If the collection has a total of 50 gems, how many gems are red?

   (A) 2

   (B) 3

   (C) 4

   (D) 5

6. The only prime factors of a certain number are 2, 3, and 7. Which of the following could be the number?

   (A) 18 x 28

   (B) 20 x 21

   (C) 22 x 63

   (D) 24 x 35

8. If a fair coin and a number cube with its faces numbered 1 through 6 are tossed at the same time, what is the probability that the coin will land heads up and the cube will land with the face numbered 4 up?

(A) $\frac{1}{12}$

(B) $\frac{1}{8}$

(C) $\frac{1}{6}$

(D) $\frac{2}{3}$

7. Which of the following equations best represents the relationship between D, distance in meters, and t, time in minutes, shown in the graph above?

(A) $D = 1.8t$

(B) $D = 8t$

(C) $D = 10t$

(D) $D = 10.8t$

Mathematics Answers

1. The correct answer is B. Percent refers to "how many out of one hundred" or, in decimal form, "how many hundredths." To find a percent, divide the group (20) by the total (46) and round the decimal to the hundredths place (0.43). This is 43 hundredths or 43/100 or 43%.

2. The correct answer is C. The exponent 4 tells how many times to multiply the base 8 by itself. In this case, $8^4 = 8 \times 8 \times 8 \times 8 = 4{,}096$.

3. The correct answer is D. This can be shown algebraically as follows. Given that $10y = x$, then 10 times $2y$ equals $20y$, which is 2 times x. Thus, when the value of y is doubled, the value of x is doubled.

4. The correct answer is B. The rectangle has length 10 and width 4; so its area is 40. The triangle can be thought of as having a base 4 and an altitude of 6. Its area is $\frac{1}{2} \times 4 \times 6$, or 12. The combined area is therefore 40 + 12, or 52.

5. The correct answer is A. A circle graph of percents represents 100% of a group. So, to find the percent of red gems, subtract the total percent of the other colors, 96%, from 100% to get 4%. Since 4% or $\frac{4}{100}$ of the gems are red, 2 out of the total of 50 gems are red. This can be determined by multiplying 50 by 4% or 0.04, or by setting up equivalent fractions: 4/100 = 2/50.

6. The correct answer is A. The prime factorization of 18 is 2×3^2 and the prime factorization of 28 is $2^2 \times 7$. So the prime factorization of 18 x 28 = $2^3 \times 3^2 \times 7$.

7. The correct answer is B. The relationship appears to be linear, so only two points are needed to find the equation. The two easiest points to identify are at (0, 0) and (10, 80). These two points give a rate of change of 80 meters in 10 seconds, which reduces to 8 meters per second. So the distance, D, increases by 8 meters for every 1 minute increase in time, t. This corresponds with the equation $D = 8t$.

8. The correct answer is A. The coin has 2 possible outcomes: heads or tails. The probability of the coin landing heads up is 1 out of 2, or $\frac{1}{2}$. The cube has 6 possible outcomes: 1, 2, 3, 4, 5, or 6. The probability of the face numbered 4 landing up is 1 out of 6, or $\frac{1}{6}$. To find the combined probability, multiply the two independent probabilities together, $\frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$.

Elementary Education:
Social Studies Subtest

(5034) Time: 50 minutes, Format: Multiple-choice

Elementary Educ. Multiple Subjects
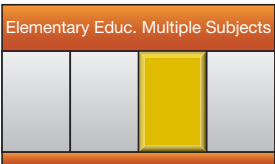
	Social Studies Categories	Approximate Number of Questions	Approximate Percentage of Subtest
I.	United States History, Government, and Citizenship	25	45%
II.	Geography, Anthropology, and Sociology	16	30%
III.	World History and Economics	14	25%
	Total	**55**	**100%**

About This Subtest

The Elementary Education: Multiple Subjects: Social Studies subtest is designed to assess whether an examinee has the broad knowledge and competencies necessary to be licensed as a beginning teacher at the elementary school level. The 55 multiple-choice questions are based on the material typically covered in a bachelor's degree program in elementary education.

Topics Covered

I. United States History, Government, and Citizenship

- Knows European exploration and colonization in United States history and growth and expansion of the United States
- Knows about the American Revolution and the founding of the nation in United States history
- Knows the major events and developments in United States history from founding to present (e.g., westward expansion, industrialization, Great Depression)
- Knows about twentieth-century developments and transformations in the United States (e.g., assembly line, space age)
- Understands connections between causes and effects of events
- Understands the nature, purpose, and forms (e.g., federal, state, local) of government
- Knows key documents and speeches in the history of the United States (e.g., United States Constitution, Declaration of Independence, Gettysburg Address)
- Knows the rights and responsibilities of citizenship in a democracy

II. Geography, Anthropology, and Sociology

- Knows world and regional geography (e.g., spatial terms, places, and regions)
- Understands the interaction of physical and human systems (e.g., how humans change the environment, how the environment changes humans, importance of natural and human resources)
- Knows the uses of geography (e.g., apply geography to interpret past, to interpret present, to plan for future)
- Knows how people of different cultural backgrounds interact with their environment, family, neighborhoods, and communities

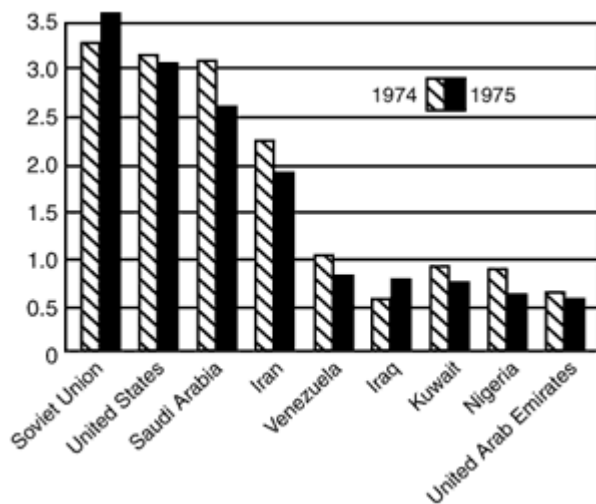### III. World History and Economics

- Knows the major contributions of classical civilizations (e.g., Egypt, Greece, Rome)
- Understands twentieth-century developments and transformations in World history
- Understands the role of cross-cultural comparisons in World history instruction
- Knows key terms and basic concepts of economics (e.g., supply and demand, scarcity and choice, money and resources)
- Understands how economics affects population, resources, and technology
- Understands the government's role in economics and impact of economics on government

11

Social Studies Sample Test Questions

The sample questions that follow illustrate the kinds of questions in the test. They are not, however, representative of the entire scope of the test in either content or difficulty. Answers with explanations follow the questions.

<u>Directions</u>: Each of the questions or incomplete statements below is followed by four suggested answers or completions. Select the one that is best in each case.

1. Mount Rainier is located in which of the following mountain ranges?

   (A) The Cascades

   (B) The Rockies

   (C) The Appalachians

   (D) The Alps

2. Which of the following types of maps shows the boundaries of countries, states or municipalities?

   (A) Thematic

   (B) Topographic

   (C) Political

   (D) Meteorological

3. Which of the following is believed to have occurred during the last Ice Age as a result of a land bridge created between what are now Siberia and Alaska?

   (A) The invention of new technologies for sheltering humans against sustained cold

   (B) The blockage of important trade routes

   (C) The establishment of human settlements in North America

   (D) Widespread famine

4. Since the end of the United States Civil War in 1865, all of the following have been major objectives of groups seeking civil rights for Black people EXCEPT

   (A) passage of affirmative action legislation

   (B) desegregation of public educational facilities

   (C) creation of a third party in national politics

   (D) passage of antilynching laws

5. The legal doctrine known as separate but equal was overturned by the Supreme Court's ruling in which of the following cases?

   (A) *Plessy* v. *Ferguson*

   (B) *Brown* v. *Board of Education of Topeka*

   (C) *Miranda* v. *Arizona*

   (D) *Mapp* v. *Ohio*

6. In the United States, the division of power between the national and state governments demonstrates the principle of

   (A) checks and balances

   (B) federalism

   (C) separation of powers

   (D) the rule of law

7. What percent of the seats in the United States House of Representatives are up for election every two years?

   (A) 33%

   (B) 50%

   (C) 66%

   (D) 100%

8. Historically India's society has been organized into hierarchical groups known as

   (A) tribes

   (B) castes

   (C) clans

   (D) denominations

9. Which of the following major world religions is monotheistic?

   (A) Hinduism

   (B) Buddhism

   (C) Islam

   (D) Shintoism

11. Jane is saving to buy a new car. Her friends are planning a weekend trip to the beach. She wants to go, but decides that saving for the car is more important. Jane's choice best demonstrates which of the following economic concepts?

(A) Opportunity cost

(B) Supply and demand

(C) Scarcity of resources

(D) Comparative advantage

10. According to the graph above, how many of the countries shown produced more crude oil in 1975 than 1974?

(A) 1

(B) 2

(C) 3

(D) 4

Social Studies Answers

1. The correct answer is A. Mount Rainier is located in the state of Washington. The greatest single-peak glacial system in the United States radiates from this dormant volcano in the Cascade Mountains.

2. The correct answer is C. A political map shows boundaries of countries, states and municipalities. A thematic map presents specific information related to a geographic area such as the location of natural resources. A topographic map shows the physical features of the land. A meteorological map presents information about weather and climate.

3. The correct answer is C. During the Ice Age, the level of the water in the Pacific Ocean lowered, exposing a land bridge across the Bering Strait. The cold northern climate encouraged many people to migrate throughout the continent in search of better living conditions.

4. The correct answer is C. The creation of a third party in national politics would be a political action, not one of civil rights.

5. The correct answer is B. In *Brown* v. *Board of Education of Topeka*, the Supreme Court ruled that segregating schools on the basis of race was inherently discriminatory. This decision overturned the precedent set by *Plessy* v. *Ferguson*, which had upheld the constitutionality of racial segregation in public facilities.

6. The correct answer is B, federalism. Federalism is the division of power between a central government and constituent governments, called states in the United States. Checks and balances refers to the constitutional arrangement of powers that prevents one branch of the government from becoming too powerful. Separation of powers refers to the division of power among the three branches of the United States government. The rule of law is the principle which holds that no person is above the law.

7. The correct answer is D. Article 1 Section 2 of the Constitution of the United States says, "The House of Representatives shall be composed of Members chosen every second Year by the People... ." All members of the House are elected at the same time every two years.

8. The correct answer is B. In the fifteenth century AD, explorers from Portugal encountered the social system of India and called these groups castes. As time went on, the four basic castes gradually grew more complex, with hundreds of subdivisions.

9. The correct answer is C. Of the major world religions listed, Islam is the only one that is monotheistic. Each of the other religions listed has as a central tenet a belief in more than one deity.
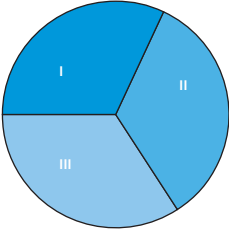
10. The correct answer is B. Since the numbers on the left side of the graph increase from bottom to top, it is a matter of determining how many shaded bars are higher than their corresponding striped bars.

11. The correct answer is A. Opportunity cost is the value of what is forgone when an economic choice is made. In this example, the opportunity cost of saving for the car is forgoing a weekend trip with friends.

Elementary Education:
Science Subtest

(5035) Time: 50 minutes, Format: Multiple-choice
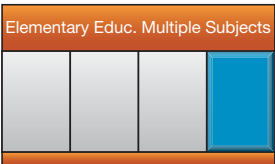
Science Categories	Approximate Number of Questions	Approximate Percentage of Subtest
I. Earth Science	16	32%
II. Life Science	17	34%
III. Physical Science	17	34%
Total	**50**	**100%**

About This Subtest

The Elementary Education: Multiple Subjects: Science subtest is designed to assess whether an examinee has the broad knowledge and competencies necessary to be licensed as a beginning teacher at the elementary school level. The 50 multiple-choice questions are based on the material typically covered in a bachelor's degree program in elementary education.

Topics Covered

I. Earth Science

- Understands the structure of the Earth system (e.g., structure and properties of the solid Earth, the hydrosphere, the atmosphere)
- Understands processes of the Earth system (e.g., earth processes of the solid Earth, the hydrosphere, the atmosphere)
- Understands Earth history (e.g., origin of Earth, paleontology, the rock record)
- Understands Earth and the universe (e.g., stars and galaxies; the solar system and planets; Earth, Sun, and Moon relationships)
- Understands Earth patterns, cycles, and change
- Understands science as a human endeavor, process, and career
- Understands science as inquiry (e.g., questioning, gathering data, drawing reasonable conclusions)
- Understands how to use resource and research material in science
- Understands the unifying processes of science (e.g., systems, order, and organization)

II. Life Science

- Understands the structure and function of living systems (e.g., living characteristics and cells, tissues and organs, life processes)
- Understands reproduction and heredity (e.g., growth and development, patterns of inheritance of traits, molecular basis of heredity)
- Understands change over time in living things (e.g., life cycles, mutations, adaptation and natural selection)
- Understands regulation and behavior (e.g., life cycles, responses to external stimuli, controlling the internal environment)
- Understands unity and diversity of life, adaptation, and classification
- Understands the interdependence of organisms (e.g., ecosystems, populations, communities)
- Knows about personal health (e.g., nutrition, communicable diseases, substance abuse)
- Understands science as a human endeavor, process, and career
- Understands science as inquiry (e.g., questioning, gathering data, drawing reasonable conclusions)
- Understands how to use resource and research material in science
- Understands the unifying processes of science (e.g., systems, order, and organization)

III. Physical Science

- Understands the physical and chemical properties and structure of matter (e.g., changes of states, mixtures and solutions, atoms and elements)
- Understands forces and motions (e.g., types of motion, laws of motion, forces and equilibrium)
- Understands energy (e.g., forms of energy, transfer and conservation of energy, simple machines)
- Understands interactions of energy and matter (e.g., electricity, magnetism, sound)
- Understands science as a human endeavor, process, and career
- Understands science as inquiry (e.g., questioning, gathering data, drawing reasonable conclusions)
- Understands how to use resource and research material in science
- Understands the unifying processes of science (e.g., systems, order, and organization)

Science Sample Test Questions

The sample questions that follow illustrate the kinds of questions in the test. They are not, however, representative of the entire scope of the test in either content or difficulty. Answers with explanations follow the questions.

Directions: Each of the questions or incomplete statements below is followed by four suggested answers or completions. Select the one that is best in each case.

1. Which of the following geological processes adds new rock to the surface of the Earth?

   (A) Volcanic activity
   (B) Glacial activity
   (C) Soil erosion
   (D) Weathering

1   2   3   4
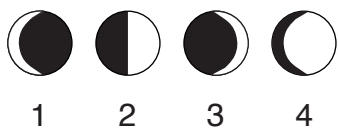
2. Which of the diagrams above best depicts the Moon as viewed from Earth at the first quarter of the lunar cycle?

   (A) 1
   (B) 2
   (C) 3
   (D) 4

3. Which of the following is NOT a way in which mammals keep themselves warm in winter?

   (A) Shivering
   (B) Perspiring
   (C) Fluffing out coat hair
   (D) Contracting certain blood vessels

4. Which of the following would be observed in a vacuum if a feather and two stones of different weights were dropped simultaneously from a height of ten feet?

   (A) Both stones would hit the ground at the same time, but before the feather.
   (B) The heavier stone would hit the ground first.
   (C) The lighter stone would hit the ground first.
   (D) All three objects would hit the ground at the same time.

5. Which of the following laboratory instruments would be most appropriate to use in determining the volume of a large block of wood of unknown density?

   (A) A metric ruler
   (B) A triple-beam balance
   (C) A 200 mL volumetric flask
   (D) A micrometer

6. Which of the following best describes a scientific hypothesis?

   (A) It ensures that successful results will be obtained from an experiment.
   (B) It must be accepted as true by the scientific community.
   (C) It is a testable proposal that may lead to experimentation.
   (D) It must be formulated by a renowned scientist.

7. Which of the following is the broadest category in the biological taxonomy?

   (A) Kingdom
   (B) Order
   (C) Genus
   (D) Species

8. Some human traits are carried by genes on the Y chromosome. A man will transmit these traits to

   (A) one-half of his male offspring only
   (B) one-half of his female offspring only
   (C) all of his male offspring
   (D) all of his female offspring

9. A chlorine compound is added to swimming pools in order to

(A) monitor the pH of the water

(B) add color to the water

(C) soften the water by precipitating harmful chemicals

(D) destroy bacteria through an oxidation reaction

10. Two campers want to bake potatoes in a fire. Both wrap their potatoes in aluminum foil. One camper, however, sticks a large nail through her potato. Which of the following is most likely to happen after the potatoes are placed in the fire?

(A) Both potatoes will cook at the same rate.

(B) Neither potato will cook because the foil will reflect the heat.

(C) The potato with the nail will cook faster because heat will be conducted into the potato.

(D) The potato with the nail will cook more slowly because heat will be conducted out of the potato.

Science Answers

1. The correct answer is A. Volcanic activity is the only process by which material from inside the Earth is brought to the surface. The other processes are means of wearing down Earth's surface.

2. The correct answer is B. At the first lunar quarter the Sun, Earth, and Moon form a right triangle, with Earth at the right angle, so that the half of the Moon facing Earth appears half lighted and half dark.

3. The correct answer is B. Perspiring is an adaptation that allows mammals to lose heat. When the body temperature rises, sweat is produced. As the water in the sweat evaporates, the skin is cooled, not warmed.

4. The correct answer is D. In a vacuum, the only external force acting on each of the objects would be the gravitational force of the Earth. This gravitational force is equal to M x g, where M is the object's mass and g is the constant acceleration of gravity (9.8 meters per second squared). According to Newton's second law, the acceleration, a, of an object times its mass is equal to the external force acting on it. For this situation, Newton's second law gives M x a = M x g , or a = g. Thus, in a vacuum all objects fall freely with the same constant acceleration g regardless of their mass.

5. The correct answer is A. To find the volume of a large rectangular block of wood, first use the metric ruler to find the length, width, and height of the block. Then use the formula for the volume of a rectangular solid—length x width x height—to determine the volume.

6. The correct answer is C. A hypothesis is a best guess or a possible explanation of a scientific problem. Scientific experimentation can either support or fail to support the hypothesis.

7. The correct answer is A. When putting living things into a biological classification scheme, the broadest category is kingdom, followed by phylum, class, order, family, genus, and species.

8. The correct answer is C. Human males generally have one X and one Y chromosome. Male offspring will only receive a Y chromosome from their father, while female offspring will only receive an X chromosome from their father. Therefore, genes on the Y chromosome are passed only to male offspring.

9. The correct answer is D. Chlorine and certain chlorine containing compounds are highly reactive oxidizing agents that are used as chemical disinfectants in a variety of situations including swimming pools.

10. Although the aluminum foil will reflect radiant energy, it will not significantly reduce the flow of energy by conduction. Because a nail is a good thermal conductor, heat will flow through the nail and cook the potato from the inside as well as from the outside. Thus, the potato with the imbedded nail will cook faster. C is the correct answer.